

The Potato News Bulletin

Published Monthly by

The Potato Association of America

VOL. II. NO. 7

JULY, 1925

Disease Control and Seed Improvement Number

EFFECT OF THE SPINDLE-TUBER DISEASE ON SPROUTING

R. W. Goss

501829
It has been shown by a number of workers that potato seed infected with the spindle-tuber disease results in a very poor stand. Sprouting is delayed sometimes as long as two months and in some cases does not occur at all. Inasmuch as poor stands are often attributed to the rotting of the seed piece by various means, or to the effects of *Rhizoctonia*, it is important to know the exact cause of the trouble.

In the course of some greenhouse experiments with the spindle-tuber disease during the past winter it was observed that all spindle-tubers which failed to produce a plant had formed secondary tubers from the seed piece, and that the frequency of this secondary tuber formation could be roughly correlated with the severity of the disease. The experiments in which this occurred were being conducted under a variety of soil moisture contents and air and soil temperatures. The seed had been obtained from plants in the field showing mild, medium and severe stages of spindle-tuber. The tuber symptoms corresponded in degree of severity to the plants which had produced them. All of this seed was sprouted in moist sand in November, and when the sprouts were about $\frac{1}{4}$ inch

long they were planted under the various experimental conditions. Secondary tuber formation occurred as follows:

Seed tuber symptoms	No. of seed tubers	No. seed pieces	Secondary tuber formation	
			No. seed	No. seed pieces
Healthy	9	52	0	0
Mild	5	33	0	0
Medium	3	14	0	0
Severe	8	48	8	27

One of the tubers listed as severe gave rise to 7 secondary tubers from 7 seed pieces planted. The 21 seed pieces of the severe type tubers, which did not give rise to secondary tubers, all produced plants showing severe symptoms of spindle-tuber.

Soil temperature apparently had no great effect on the formation of secondary tubers as this occurred as often at 15° C. as at 25°. Secondary tuber formation occurred more often at a low soil moisture content than at higher ones. Six tuber units planted at moisture contents of $\frac{2}{3}$, 1 and $1\frac{1}{2}$ the soil moisture equivalent gave the following results: At the low moisture 10 out of 12 seed pieces formed secondary tubers, 2 out of 5 at the medium and 5 out of 12 at the high.

Later in the winter further tests were made in an attempt to obtain more information under a variety of soil moisture contents and at different depths of planting. The infected seed tubers always gave rise to severe spindle-tuber plants, and sprouting was delayed, but no secondary tubers occurred in any instance. This would indicate that this type of secondary tuber formation is correlated with too short a rest period of infected tubers. If this is true we would expect to find this occurring with infected seed planted in the South more often than with the spring planting in the North. In connection with this point a number of such secondary tubers was found in Louisiana this spring in fields having poor stands.

The secondary tubers which developed in the greenhouse were not formed internally as has been described for such tubers sometimes occurring in storage. Inasmuch as the tubers were all sprouted before planting, the secondary tubers were the result of abnormal development of the sprout. Such tubers average about 15 grams in weight from seed pieces of 20 to 30 grams. A few of these secondary tubers were planted later in the season and developed weak spindle-tuber plants. It is possible that volunteer plants might be produced by such tubers under some climatic conditions.

It has been impossible in many experiments to obtain a positive correlation between the degree of severity of the symptoms in the plants with the symptoms of the seed tubers used. The conditions under which the plant starts growth greatly modify the above ground symptoms, and the environmental conditions later in the season affect the severity of the symptoms of the tubers produced by such plants.

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It was also found that when whole spindle-tuber seed was planted there was a loss of apical dominance, all eyes developing weak sprouts. The increase in the number of eyes in tubers affected with spindle-tuber combined with the loss of apical dominance results in an excessive number of weak sprouts when whole tubers are planted, which might sometimes be confused in the field with physiological disease described as spindling sprout. When the seed is cut, however, the weaker sprouts apparently fail to develop, as cut spindle-tuber seed usually results in a smaller number of stems per plant than does healthy seed.

A REAL PROBLEM

E. L. Newdick, Dept. of Agriculture, Augusta, Maine

Each year an important question with those who are interested in seed certification work is "Where are we to obtain foundation stock?"

During the growing season of 1924 in Maine, special effort was made to locate some stock as nearly disease-free as possible so that a large quantity of good seed would be available for the planting of 1925. Stock was selected which at no time during the season showed more than 1 per cent Mosaic and only a trace of Leaf-roll. A wide distribution was made and the writer had occasion this week to make an inspection of two or three lots, and is much surprised to note the presence of 4 and 5 per cent Mosaic in several counts.

The real question involved, it would seem, is whether or not we are practical with our certification rules. With special reference to the Green Mountain variety, the passing percentage for Mosaic was lowered to 3 per cent on the first inspection and 2 per cent on the second in Maine for this season. From the best information available, there won't be many acres of Mountains that will be able to stand such a rigid ruling. The Maine inspection service wants to be as exacting as possible and be reasonable but it is true that those who want Green Mountain seed potatoes will always have to buy the best of those that are available, no matter what the disease requirements are. With this as a basic fact, unless we can determine some real method for growing foundation stock, it is going to be hard for us to talk in terms of 3 per cent for degeneration diseases. This is not true of the Irish Cobbler and Spaulding Rose varieties, because they are apparently more disease resistant. Some of the states where Russets are the main crop have adopted very rigid regulations, and it may be very possible for them to live up to them from a practical standpoint. There are hardly any grown in Maine, so we do not have very definite information.

As to sources of foundation stock, this whole subject is rather a matter of guess work at the present time. We have rare instances where some of our growers have, by means of tuber unit and hill unit, been able to maintain good foundation stock. On the other hand, we have many men who have apparently been careful with their tuber unit work, by this I mean careful of their original selection, careful in their disease readings and in their roguing, and still have not made sufficient progress to keep them interested in the work. It seems that there is a lot of work yet to be done before we can advise our growers whether or not we can profitably and surely maintain any sort of a seed plot that will guarantee them foundation stock. Purchasing from some known source where the year previous the stock was especially good has been about the best bet to date for the man who wanted to go into the certified seed game. Gradually, however, year after year, these sources have grown less until now great care must be taken in the purchase and handling of foundation seed.

Over a long period of years, it has been the policy of this Department to be very careful about recommending seed for anyone who wished to be reasonably sure that their stock would pass inspection. It has always been safe enough to advise carefully, but positive statements have no place when recommending seed. There are many factors involved but probably the most important one is that there is no way of checking just how much roguing has been done on some fields. For example, an inspector from this Department felt very proud of a certain lot of potatoes grown in a community in which he was doing inspection work. As a matter of fact, he assumes his share in recommending this stock for quite wide distribution and this stock is now reading 5 per cent and more, whereas the last field inspection in 1924 showed that it was practically impossible to find a diseased plant.

Another important factor is the weather. A year ago, it was extremely dry at the time of inspection. This season Maine has had plenty of moisture and potato diseases are very easily read and, in the opinion of the writer, there are mild forms showing which would not be seen in a dry season. As a matter of fact, in two weeks time, if the weather is normal, some of the milder forms will not be seen this year.

Some men with whom we have talked made the statement that as soon as the foundation stock problem is solved, certification work will be unnecessary. This does not seem true because there are so many other points which need watching, in order to insure the seed buyer a good product. If, however, we can improve our methods of securing foundation stock, we will go a long way toward the general improvement in the whole potato industry, both seed and table stock.

It is hoped that the Experiment Station workers will continue their efforts and give to those of us who are interested in certification work what information they can, as fast as it is available.

THE POTATO NEWS BULLETIN

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

AT WASHINGTON, D. C.

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"Entered as second-class matter May 31, 1924, at the post office at Washington, D. C., under the Act of March 3, 1879."

SUBSCRIPTION PRICE \$1.00 PER YEAR

As stated in the June issue of this publication the July and August numbers will be devoted chiefly to the control of diseases and seed improvement. This number indicates that an excellent start in running special numbers has been made, according to a letter recently received from Prof. Goss, and other promises the August number will be superior to the present one. Everybody is invited to help to make the August number the best number ever published.

The following men were requested in the last issue to assist the editorial staff in securing material for the July and August numbers.

- R. W. Goss, Agricultural College, Lincoln, Nebr.
Chas. Hungerford, College of Agriculture, Moscow, Idaho.
Fred Krantz, University Farm, St. Paul, Minn.
H. C. Moore, Agricultural College, E. Lansing, Mich.
E. L. Newdick, Dept. of Agriculture, Augusta, Maine.
C. Tice, Department of Agriculture, Victoria, B. C.
G. L. Tiebout, Agricultural College, Baton Rouge, La.
John Tucker, Agricultural College, Guelph, Ontario.
F. Weiss, U. S. Dept. of Agriculture, Washington, D. C.
G. L. Zundel, Agricultural College, Pullman, Washington.

THE SEPTEMBER NUMBER

In early autumn the late potato growers should give the question of storage careful consideration, if they have not made previous preparations and are not well equipped to store part or all of their crop. Most potato storages can be improved upon and this is especially true in reference to the control of humidity and temperature by proper ventilation. More thought should be given both to the storage of seed and table stock. The September number will be devoted to physiological and storage problems.

The following men are requested to assist the editorial staff by writing articles themselves and securing material from others:

J. T. Rosa, Jr., University Farm, Davis, California.
 Wm. Stuart, U. S. Dept. of Agriculture, Washington, D. C.
 L. M. Marble, Canton, Pennsylvania.
 Paul M. Williams, U. S. Dept. of Agr., Washington, D. C.
 E. P. Miller, 192 N. Clark Street, Chicago, Illinois.
 John Bushnell, Ohio Agr. Experiment Station, Wooster, O.
 Julian Dimock, East Corinth, Vermont.

It is hoped that these men will take the advantage of every opportunity to make the September issue the best number of The Potato News Bulletin ever published. The editor has so much confidence in these men that he believes they will do it even better than the coming August number, though they may have to work hard to outclass it.

THE OCTOBER NUMBER

This number will contain articles on marketing and transportation. These are vital subjects in which every commercial grower, as well as those engaged in marketing and transportation, are interested.

The following men are requested to take an active part in making the October number even better than the coming September issue:

E. A. Stokdyk, Agr. College, Manhattan, Kansas.
 W. B. Duryee, Department of Agr., Trenton, N. J.
 Daniel Dean, Nichols, New York.
 H. W. Samson, U. S. Dept. of Agr., Washington, D. C.
 J. W. Weston, Michigan Agr. College, E. Lansing, Mich.
 Wilfrid Boulter, Dept. of Agr., Charlottetown, Prince Edward Island, Canada.
 G. W. Waller, Hastings, Florida.
 H. G. Zuckerman, 216 Drumm St., San Francisco, Calif.
 W. H. Olin, 237 Equitable Building, Denver, Colorado.

The editor wishes to suggest that it is none too early to begin working on this number. It is hoped that considerable thought will be given to the best means of advertising and marketing certified seed potatoes.

— L O S T —

While at the State Institute of Applied Agriculture at Farmingdale, Long Island, E. L. Newdick of Augusta, Maine missed an Eastman Kodak and a leather collar-case. Mr. Newdick took the missing of these articles as a joke thinking that some one on the tour had played a trick on him. He even left the island thinking that some one would forward these articles to him. On July 9th, Mr. Newdick wrote as follows.—“I am still waiting for someone to send back my \$65.00 camera, also a leather collar case which I had in my bag. I am here to state that someone was a good picker of high-grade articles.”

This notice is not being published at the request of Mr. Newdick. The editor is doing it with the spirit of helping to locate the missing articles. If anyone knows anything about this affair please inform Mr. Newdick or the editor.

CORROSIVE SUBLIMATE NOT GOOD WITH HARD WATER

George H. Valentine

Prof. A. L. Bushey, Analyst for Agronomy Department, recently made some laboratory determinations regarding the effect of some South Dakota waters on mercuric chloride (corrosive sublimate) in solution.

A solution was made up to the same concentration as is used for treating seed potatoes (4 oz. to 30 gal. of water). After being allowed to stand for 2 hours, tests were made to see what percentage of the bichloride of mercury was changed over or lost so far as its use as a disinfectant is concerned.

The following samples of water were tested and are thought to be typical of water in the South Dakota potato district:

Name	Address	Percentage of corrosive sublimate lost.
V. H. Belk.....	Henry	67
Otto Stenwedel.....	Hayti	54
Clarence B. White.....	Clark	48
Brookings City Water...	Brookings	30
E. J. Pruessing.....	Hecla	28

The first four samples were shallow well water while the last sample was from an artesian well in northern Brown County.

It is not known just how weak a solution may be to be ineffective in controlling tuber-borne diseases. This would vary according to amount of disease present and also to the condition of the potatoes—whether excessively dirty or clean.

Further work may be done along these lines later, but the information to date leads one to believe that corrosive sublimate does

become ineffective to a large degree with the use of some waters in the state. Soft water, if available, would be a remedy for the situation, or the use of hot formaldehyde—1 pint commercial formalin to 15 gallons at 118-124 degrees F. for two minutes—has been found to be very satisfactory wherever tried, and is a convenient and rapid method if a large number of potatoes are to be treated. The solution may be heated by building a fire under a steel vat, or by use of steam. A good dairy thermometer should be used. Some growers cooperate and fire up a threshing engine, others haul their potatoes to some central point near a creamery or other source of steam.

NEBRASKA CERTIFIED SEED PROSPECTS FOR 1925

H. O. Werner

The Nebraska Certified Potato Growers, Co-operative, have received application for inspection on a slightly smaller acreage than was listed a year ago. Growers are not required to make a definite statement of the acreage they will plant until the latter part of June, but it is not expected that the estimates given at the time application for inspection was made will be changed materially. Prices averaging below cost of production in 1923 followed by a very low yield in 1924 have caused many growers to become discouraged and discontinue their efforts at potato production.

As a precaution against the possibility of high temperature masking mosaic symptoms at the time of the field inspections, the Certification Committee of the College of Agriculture requires the Association to plant a test plat containing a sample of each lot of seed that is entered for inspection during the summer. This plat is planted about six weeks earlier than the commercial fields and the plants are large enough to show mosaic symptoms before the hot weather sets in with the consequent danger of masking. The test plat is also used to estimate the percentage of spindle tuber in the submitted samples and furnishes the college a check on the work done by the inspection service of the Association.

Applicants for the inspection service in Nebraska are not required to plant certified seed as it is believed that there may still be a few good strains throughout the territory on which application has never been made. The percentage of rejections on new lots has always run very high but an occasional lot proves to be of a quality worthy of certification. Practically all lots on which application has been made this year were certified in 1924. Only a small percentage of new lots having been entered. This should mean a smaller proportion of rejections and a final product measuring well with the Nebraska certified seed of previous years.

The association suffered severely last fall in its marketing efforts, due to "boot-leg" stock being sold as Nebraska certified at

a price considerably below that which the Co-operative was asking. An intensive advertising campaign will be undertaken this year through which it is hoped that the purchaser of certified seed may be educated to look for the genuine product. An effort will also be made to convert more table potato producers to the use of certified seed.

The certified seed area has been favored by recent heavy rains, the temperature has reached a point where the soil is rapidly warming up and as it is in very good condition as far as moisture is concerned, ideal planting conditions can be expected the first two weeks in June, the time at which most of the planting is done.

POTATO SEED TREATMENT IN THE KAW VALLEY

D. R. Porter, Extension Plant Pathologist

The principal Irish Potato producing section in Kansas is located in that portion of the Kaw River Valley extending from St. Mary's east to Kansas City, Kansas. The annual acreage has increased somewhat during the last four or five years, the acreage this season being about 14,000. The average yield in 1924 was slightly over 160 bushels per acre, one grower, Mr. Chas. Speaker, producing over 400 bushels per acre.

Much of the soil in the Valley was deposited by the Kaw River flood of 1903, and is a fine sandy loam, ideally suited to early potato production. The climate in the valley is unusually favorable to potatoes, the rainfall usually being sufficient to insure a good set and a uniform crop.

In 1918, according to available records, not an acre of potatoes in Kansas was planted with treated seed. In 1919, seed for about 500 acres were treated; in 1920 seed for about 1000; in 1921, 2200; in 1922, 3000; in 1923, 4500; in 1924, 6800, and this year, as accurately as can be determined to date, approximately 11,000 acres were planted with treated seed. About 75 per cent of the seed was dipped in hot formaldehyde for three to four minutes at 124-126 degrees F., and about 10 per cent soaked in corrosive sublimate 1-1000 for 90 minutes. Although this is the first year that the Kansas Experiment Station is recommending hot formaldehyde, the above figures show that it is much more popular than is corrosive sublimate. Nearly all the treated seed planted previous to this year was given the corrosive sublimate treatment.

Although the hot formaldehyde method of potato seed treatment, as worked out by Dr. I. E. Melhus of the Iowa Station, calling for a two minute dip in a formaldehyde solution heated 118-122° F., was tried out in Kansas by Mr. R. P. White, who is conducting the potato disease investigations, it was found that a two minute dip was not long enough for the best results where the potatoes were treated in the sacks, it being apparent that it took a longer

time for the solution to reach the potatoes in the center of the sack. Accordingly, the time was increased to three and even to four minutes without causing any apparent injury as far as germination was concerned, and giving better control of *Rhizoctonia* than if soaked only two minutes. It was also found that a temperature of 124-126° F., not only gave better kill of the larger sclerotia of *Rhizoctonia* than did the temperature originally recommended by Melhus, but also, like the time extension, apparently had no ill effects on seed germination. Accordingly, the method now recommended by the Kansas Station consists of a 3-4 minute dip in a solution of formaldehyde, one pint in 15 gallons of water, maintained at a temperature between 124 and 126° F.

Although hot formaldehyde is being enthusiastically received by the Kaw Valley potato growers, yet, there are instances on record where it has not given satisfactory control of *Rhizoctonia*. In tracing back these cases, it was found that one of several things might have been responsible. In some cases growers failed to follow directions as to temperature and length of time. In other cases the solution was made up at the rate of one pint in 30 gallons of water instead of 15. In my trip through the valley at treating time this spring, I found thermometers off as much as 10°. It is obvious that this practice would result in dissatisfaction. The user of the hot formaldehyde dip must follow directions to the letter if the best results are to be obtained.

Since many of the Kaw Valley growers buy their seed from the north in the fall and store them locally, the question arose as to whether or not seed could be treated as it was unloaded from the car in the fall and then stored over winter. Accordingly a series of tests were outlined with Mr. James W. Trant, a prominent grower at Edwardsville, to determine the effectiveness and practicability of fall treating. Results secured last year showed that fall treating was just as effective as spring treating and did not injure the seed. This season Mr. Trant had five seed treatment plots. One was planted from fall treated seed, one from spring treated and one from seed treated both times. These three lots were dipped in hot formaldehyde for 3 to 4 minutes at 124-126° F. A fourth plot was planted with seed treated this spring in corrosive sublimate 1-1000 for 90 minutes, while the fifth was the same seed used in the tests above, planted without treatment of any kind. During the Annual Kaw Valley Potato Tour which was held the first week of June, these five plots were examined. Ninety per cent of the plants in the untreated plot were severely infected with *Rhizoctonia*, infection having proceeded so far, in some cases, as to girdle the stalks or even the stolons, preventing the formation of potatoes. The corrosive sublimate plot showed 40 per cent very slight *Rhizoctonia* infection. Of the three hot formaldehyde treated plots, the spring treated showed 20 per cent very slight infection, the plot planted from seed which was treated both in the fall and spring showed 10 per cent slight infection, while the

fall treated plot was clean. Infection in the three last mentioned plots was doing no apparent damage. Yield records will be taken next month to determine the relative effectiveness of fall vs. spring treatment. If fall treatment again proves satisfactory, it is likely that much of the seed shipped into the valley in the fall will be treated as it is unloaded from the car, thus saving a rehandling in the spring when the growers are in a rush to get the seed in the ground. A precaution advanced by Mr. Trant is to be sure the potatoes are thoroughly dry before storing.

It is estimated that 85 per cent of the loss due to potato diseases in the Kaw Valley is due to (*Rhizoctonia solani*.) Minor losses are caused by blackleg, scab, virus diseases and occasionally early blight. This season blackleg has been more destructive than for several years, according to the plant pathologists of the Experiment Station. In one field of untreated seed, blackleg killed 60 per cent of the plants by June 3, while the same seed treated in hot formaldehyde showed only 5 per cent infection. Scab is gaining a start in a few fields in the valley but is not especially serious as yet.

There are three types of hot formaldehyde commercial seed treating machines used in the valley. One of the first to be used was the Breen Machine, manufactured by the Hatton Hardware Company of Hatton, North Dakota. The potatoes were treated loose in the first Breen Machine, but the later model is large enough to accomodate single sack treatment. The latter machine proved very satisfactory, and many of them are now in use. Heat is supplied by gas or coal oil burners.

The second commercially made machine came from Ed Askegaard of Moorehead, Minnesota. It is much more complicated than the Breen Machine, but has the advantage of being sufficiently large to hold two sacks at a time. The sacks are lowered into and raised from the hot solution by means of a wooden platform operated by a crank. Heat is supplied by means of four gas burners. Mr. M. T. Kelsey, one of the largest growers in the Valley, used an Askegaard machine this year, but finds it even too small for his use. He grows about 200 acres of potatoes annually, and intends to build a 4 or 5 sack machine for use next year.

The third typ of machine is comparatively new. It is made by Robert Butler of Topeka, is simply made, but of the right size and price for the average grower. It is handled by Williams and Haney of Topeka and by the Green Bros. Hardware Company at Lawrence, Kansas. These three machines were all in use in the valley last spring and appear to be perfectly satisfactory if correctly operated.

Several growers made their own seed treating equipment. W. G. Phillibert, of Kansas City, simply dug a trench under an old stock tank, put a stove pipe at one end, and built a wood fire underneath. He was able to maintain a constant temperature.

Mr. G. E. Kelsey & Son of Topeka, rigged up an old creamery tank about four feet wide and ten feet long, put in a false bottom

of iron bars about six inches above the bottom of the tank, with steam coils placed between the bottom of the tank and the false bottom. Heat was applied by means of a steam boiler. Mr. Kelsey stated that the whole outfit cost him about \$75.00.

Mr. M. G. Dreyer, of Wyandotte County placed a steam radiator flat side down in a cement tank, built a second bottom of wood on top of the radiator, and supplied the heat by a boiler. Other growers used various contrivances, but space will not permit a detailed discussion of any of them.

BORDEAUX FRESH FROM THE HOPPER

J. M. Hurley, Syracuse, N. Y.

The most interesting thing the writer observed on the recent Long Island potato tour was the method which William Fanning, Riverhead, employs in mixing his Bordeaux. His rig consists of a flat topped water tank mounted on a wagon, holding 600 gallons and filled from an elevated water tank. On this tank is mounted a double action hand pump which delivers two 2 inch streams of water into the bottom of two copper lined boxes, two and a half feet deep, six inches square on bottom and nine inches square on top. The flow from these two boxes unite while passing through spout and spills into a twelve inch square mixing box which has a ripple in bottom and from there flows into a pipe leading to the sprayer.

In operation ten or twelve pounds of copper sulphate, small crystals, is dumped into one of the boxes and an equal quantity of lime in the form of paste into the other. When the spray tank is to be filled the operator starts pumping and the equal flow of water thru the two boxes containing the lime and vitrol and the agitation resulting from their fall into the mixing box insures a Bordeaux which will stay in perfect suspension for hours. In fact Mr. Fanning has kept such Bordeaux which was two-thirds in suspension months afterwards.

The writer asked Mr. Fanning how quickly he could fill his hundred gallon spray tank, and was told that it could be done in three minutes. In practice however, the man at the pump can fill the spray tank while the man at the sprayer is oiling up. With the equipment above described and an eight row motor driven spray rig, two men and a team of mules spray thirty-five acres a day.

POTATO CROP SHORT; PRICES ADVANCING

(Contribution from the Fruit and Vegetable Division, Bureau of Agricultural Economics, U. S. Department of Agriculture.)

The lightest potato crop since 1919 is indicated by the forecast of 350,000,000 bushels, based on July 1 condition. This is 23 per cent

less than last year's record crop of approximately 455,000,000 bushels. Average production for the five years, 1920-1924, is 418,000,000 bushels. This preliminary forecast will change of course, with the changing conditions in subsequent months, but at present there is every indication of a crop considerably below average. Acreage as a whole is 6 per cent less than that of last year, and condition on July 1 was 84 per cent of normal. All the important late-potato States except Colorado and Idaho show decreases from the 1924 production. The crop in five leading Eastern States is forecast at 22 per cent less than last season. In four principal North Central States, there may be about 37 per cent fewer potatoes than in 1924. Only three of the important States,—Maine, Ohio and Idaho,—have an indicated production slightly above the five-year average. Detailed figures for 15 states are given below:

Potato Production

in thousands of bushels, i. e., three zeros omitted

Important States	1925 Forecast from July 1 condition	Harvested in 1924	Harvested, Five-Year Average, 1920-24
Maine	33,088	41,175	31,725
New York	37,184	46,620	39,673
New Jersey	5,760	11,544	11,767
Pennsylvania	24,837	28,792	26,449
Virginia	13,759	19,200	16,899
Ohio	10,988	11,500	10,724
Illinois	6,300	11,960	8,522
Michigan	22,920	38,252	35,063
Wisconsin	22,535	31,460	30,586
Minnesota	24,676	44,352	38,524
Iowa	6,638	10,744	8,232
Missouri	6,940	10,200	7,243
North Dakota	8,963	11,960	12,487
Colorado	11,679	11,640	13,607
Idaho	12,074	10,725	11,542
United States Total	349,566	454,784	417,848

In view of the relatively light crop of intermediate potatoes, all indications point to comparatively high prices for some time to come. Light production in the Middle West should afford a wider outlet for eastern potatoes. The total estimated crop in eight intermediate states is 8,520,000 bushels, or 3,000,000 less than last year. Maryland and New Jersey show sharp decreases. During the first week in July, movement was becoming active in the Kaw Valley of Kansas and was starting in Kentucky, Missouri, Colo-

rado, Utah, Idaho and Washington. Recent reports from the Orrick section of Missouri indicate possibly 500 to 600 cars in that territory, or half of last year's output. Quality will improve as the season advances. Late frosts, followed by a period of dry weather, also reduced the Kaw Valley crop about 50 per cent, compared with last season. Between 2,000 and 3,000 cars are expected from that source. Many buyers are on the ground and it is believed that a larger percentage of shipments than usual will be sold cash-track. Price trend was upward, even though general quality of the stock may not be up to average. Movement from Missouri and Kansas may be practically completed by August 1. Condition of the crop in the Ogden district of Utah was reported very good, with at least 800 cars of early stock expected. Plantings were reduced in the early section of Idaho, around Caldwell.

Although best Irish Cobblers on the Eastern Shore of Virginia touched low f. o. b. mark of \$4.15 per barrel about July 1, they later recovered to \$4.75-\$5.50. Demand and trading were active. Shipments increased slightly during the week ending July 4 to 2,370 cars, while movement from Norfolk section decreased 50 per cent to 365 cars. The season was rapidly closing in North Carolina and Oklahoma. Kansas was the only other state that shipped more than 200 cars of new potatoes. On first shipments in late June, Kaw Valley growers received \$1.90-\$2.00 per 100 pounds, but by early July the cash-track price had advanced to a range of \$2.25-2.40 on sacked Cobblers and Early Ohios. Growers evidently are making a fair profit on such sales, as the estimated average net cost of production in Central States the last two years has been about 51 cents per bushel. In Eastern States, the average cost per bushel has been 68 cents, which would be around \$1.90 per barrel.

City market prices were advancing. The premium above last year's corresponding sales ranged from \$1.75 a barrel on eastern stock to 50 cents per 100 pounds on midwestern potatoes. In spite of liberal arrivals, the New York City jobbing price on Eastern Shore of Virginia Cobblers advanced to \$5.75-\$6.25 per barrel, and top of \$6.50 was reached on the Chicago carlot market. Receipts from Norfolk section usually brought 25 cents or 50 cents less than other Virginia potatoes. Cincinnati reported refrigerated Bliss Triumphs from the Middle West at \$4-4.25 per sack, while ordinary shipments to other markets sold mostly at \$2.75-\$3.50 per 100 pounds. Atlanta dealers quoted top of \$4 on Alabama stock, Kansas arrivals ruled \$2.85-\$3.15 in Chicago. Old potatoes closed firm to higher. Sacked Maine Green Mountains sold at \$1.65 per 100 pounds in New York, with Chicago sales of northern round whites bringing \$1.35-\$1.50. During the opening week of July, shipments of old stock dropped to less than 300 cars, mostly from Maine. During the same week last season, only 30 cars moved. Output of new potatoes decreased to 3,600 cars, compared with 4,800 in the corresponding period a year ago.

Costs of Production

Reports from 1,590 farms in all parts of the country give some idea of the cost of producing potatoes in 1924. Figures from growers having only an acre or less of potatoes were not included in the tabulations. Sectional groups were arranged to represent as nearly as possible those parts of the country having similar production conditions:

AVERAGE ESTIMATED COST OF PRODUCING POTATOES IN 1924

Item	North-eastern (A)	Eastern (B)	South-eastern (C)	Central (D)	North Central (E)	W. S. Central (F)	Western (G)
No. of reports:	431	167	53	212	508	37	181
Acres per crop per farm	7	8	9	4	6	11	9
Yield per A. (bus):	171	123	98	111	125	76	144
Cost per acre—							
Prepare and plant	\$11.63	\$ 9.09	\$ 7.55	\$ 7.23	\$ 6.71	\$ 6.96	\$ 8.48
Cultivate:	6.28	5.20	4.29	4.22	3.48	3.32	4.31
Harvest:	14.18	10.10	8.82	8.39	8.45	6.24	12.46
Market:	12.63	9.10	8.46	6.94	6.88	4.53	8.63
Miscellaneous labor: 1	4.12	1.70	2.47	1.87	2.42	1.37	2.87
Fertilizer and manure	24.20	16.63	21.19	6.57	5.11	6.83	4.39
Seed:	13.16	13.01	15.26	10.62	5.90	12.30	10.49
Land rent:	7.97	11.24	7.04	7.26	5.12	6.59	8.71
Miscellaneous costs: 2	5.81	6.27	6.26	3.13	3.31	3.44	8.65
Total:	99.98	82.34	81.34	56.23	47.38	51.58	68.99
Credit per acre for by-products:	.44	.28	1.33	.14	.28	1.16
Net Cost—							
Per acre:	99.54	82.06	80.01	56.09	47.10	51.58	67.83
Per bushel:	.58	.67	.82	.51	.38	.68	.47

1. Includes miscellaneous labor, irrigation and water, spraying and spray material.

2. Sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.

(A) Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey and Pennsylvania.

(B) Maryland, Virginia, West Virginia, North Carolina, Kentucky and Tennessee.

(C) South Carolina, Georgia, Florida, Alabama and Mississippi.

(D) Ohio, Indiana, Illinois, Iowa, Missouri, Kansas and Nebraska.

(E) Michigan, Wisconsin, Minnesota, North Dakota and South Dakota.

(F) Louisiana, Texas, Oklahoma and Arkansas.

(G) Montana, Wyoming, Colorado, Arizona, Utah, Idaho, Washington, Oregon and California.

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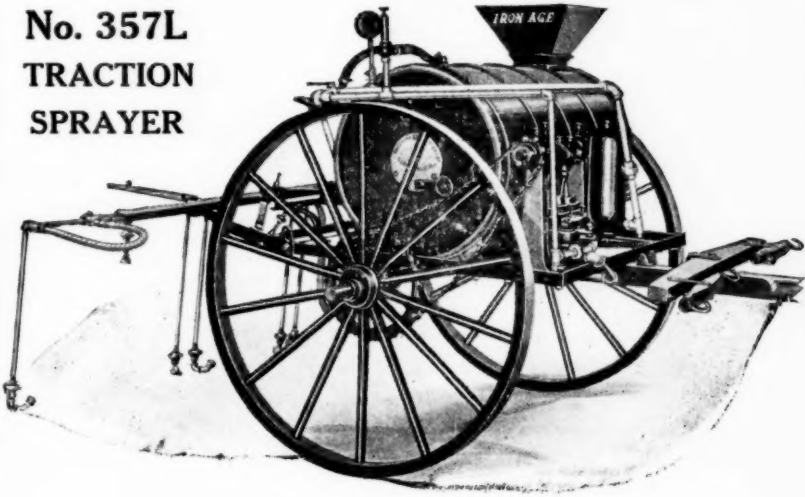
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POTATO MEETINGS AND TOURS

IMPROVE AND TREAT SEED POTATOES BY THE CARLOAD

FEATURES OF THE MINNESOTA SEED POTATO TOUR

C. L. Fitch

This year the field tour for the inspection of seed potatoes in Minnesota is to be run in the Red River Valley, starting July 28. This vast region from southern Minnesota and northern South Dakota to Hudson Bay, is one of the great potato growing regions of the United States and of the world and one of the leading seed potato districts of North America. The Red River, unlike most every other river of the United States, flows north and the ice breaks up at the head waters first. This fact, the gentle fall to the north, and geological history that indicates that the region was once a lake, have made a wide rich valley. The farming in the valley is still of the extensive rather than the intensive order following the habit of the bonanza wheat farming of 50 years ago. Fields of potatoes of 200 or 300 or even 500 or 800 acres are planted every year.

Still further improvement in the methods of farming will increase the output but the present production may be considered by some as large when it is known that Clay County is the second greatest producing county in the United States, or following Aroostook County Maine. Clay County has sold one crop of potatoes for more than five million dollars.

The Commercial Club Plots at Moorhead

The Commercial Club at Moorhead, the gate city of the Red River valley and chief point in Clay county, is putting on this year for the first time, four seed test plots. In each of these plots is planted a sample from each of a large number of farms growing certified seed potatoes in the county. All these potatoes are planted by the tuber unit method. In this way a large number of farmers and potato dealers of Clay County will have a chance to see what seed potatoes and what farms' output are producing the best and largest crops. If the Commercial Club be rigid in carrying on these plots without fear or favor, the benefit to the county growers will be great. Moreover, such intelligent methods of improving of the local product should be considered by the user of seed potatoes in the cornbelt and in the South as indications that Clay County is a good place to buy seed potatoes.

The chairman of the agricultural committee of the Commercial Club of Moorhead is Mr. A. O. Christensen, vice-president of the Farmers' and Merchants' State Bank. Mr. W. J. Koppen of Moorhead, now a leading potato dealer and one time inspector in charge

of Clay County for the Minnesota State Certification Board, is an active member of the committee. Prof. E. M. Gillegg of the Moorhead High School is in direct charge of the plots.

These plots are run in cooperation with the plots at Clear Lake, Iowa and Muscatine, Iowa, and were put on at the suggestion of Professor C. L. Fitch of Iowa State College. Those in Iowa are in cooperation with Mr. A. G. Tolaas, chief inspector of the certification board at University Farm, St. Paul, Minn. and in the two plots are planted in quintuplicate samples from all the farms in Minnesota growing certified Ohios, Irish Cobblers or Rurals.

Similar plots in cooperation with Mr. Tolaas have been put on in Missouri in 1925 for the first time by prof. E. M. Page of the Experiment Station at Columbia, and in Kansas by Prof. Donald Porter of Manhattan.

Treating Seed Potatoes by the Carload

At Moorhead, a beginning was made in 1925 in the treating of seed potatoes by the carload at the source, which are to enter general trade. The system used is the Melhus or hot formalin method, which requires only 2½ minutes, leaving the potatoes with nothing on them and doing as efficient a job as can be done by the use of corrosive sublimate. The latter process leaves the potatoes poisonous and could not be used for potatoes going into general trade.

Full opportunity will be given to see the methods and the apparatus used for treating seed in warehouses by the carload. The profits and benefits to be derived from the general establishment of seed treatment by carloads at the source is to be enormous, particularly to the small user of seed, who cannot and should not treat a few bushels but who would gain, so it is figured, 65 cents per bushel in added crop beside the dime it will cost him for every treated bushel.

PROPOSED CONFERENCE FOR THE STUDY OF POTATO DEGENERATION DISEASES

In reply to our circular letter, sent to men interested in potato degeneration diseases, practically all were in favor of holding the proposed conference. Some 35 men signified their intention of attending the meeting, while an additional 10 to 15 men were somewhat doubtful.

The majority preferred the early date proposed. Some of the specialists on certain degeneration diseases wrote that they could not be present after the Kansas City meetings. Others suggested that the men attending the conference would have the diseased material fresh in their minds when further discussions of papers on this subject were presented at Kansas City. After considering the various points brought up in the replies, it was decided that Monday, December 28, the day before the Kansas City meetings would

be the most advisable date. About 25 men stated that they would send diseased material. Thus representative material of practically all described degeneration diseases will be on hand for observation.

Some criticisms to the proposed conference at Lincoln were made as follows:

1. That it would be more advisable to hold the conference at Kansas City in conjunction with the sectional meetings of the society. If such a step were taken, greenhouses would have to be available, as well as the services of a man to grow the diseased material. Further, the diseased material must be grown in controlled greenhouses to bring out the various symptoms of the different degeneration diseases.

2. That the extra cost of the trip to Lincoln would prevent some of the men from attending the conference. Perhaps the objection would be offset by the large number of men who could obtain expenses from their respective institutions for attending such a conference, where expenses might not be allowed for the A. A. S. meeting.

As regards railroad rates, all men coming from the north and west of Lincoln can obtain a stop-over in Lincoln without invalidating their reduced fare tickets to Kansas City. For those north and east of Lincoln, transportation to Kansas City via Omaha can be purchased with a stop-over at Omaha, a 75-minute journey from Lincoln. Arrangements can be made to continue the trip direct to Kansas City on Monday night by special Pullman without returning to Omaha, by paying the difference between the rate from Omaha to Kansas City and Lincoln to Kansas City. For persons coming from the south and southeast a straight fare from Kansas City to Lincoln and return will be necessary. However, the total expense of the round trip from Kansas City to Lincoln, including return Pullman, will be slightly in excess of \$15.00.

3. The value of observing disease symptoms of potato degeneration diseases under controlled greenhouse conditions was questioned by several men. Our opinion is that it would not be advisable to grow all the degeneration diseases in the field in any state, owing to the fact that new diseases might be introduced. No climatic conditions in any section of the country would favor the expression of all the symptoms of all the degeneration diseases at the same time. It appears that if these diseases in which the symptoms are so variable, cannot be identified under control conditions it would be useless to attempt to compare them under diverse field conditions. In addition to the diseased plants, material will be exhibited showing the effect of environmental conditions on the various diseases.

Cold storage facilities are available here and tubers will be taken care of from now until October 1, when they will be planted. In sending in material kindly state your name, location, name of disease, potato variety, date when dug, and information concern-

ing the environmental conditions needed to bring out the best expression of the symptoms.

We would be glad to get any suggestions or criticisms that will make this conference a success.

Respectfully yours,

Geo. L. Peltier,

R. W. Goss,

Department of Plant Pathology

H. O. Werner,

Department of Horticulture

SEED POTATO CERTIFICATION CONFERENCE FREEHOLD, N. J. JUNE 22-23

W. H. Martin

At the seed potato certification conference held at Freehold, New Jersey, June 22-23, under the auspices of the Potato Association of America, the following were present: R. E. Hartman, W. A. McCubbin, Pennsylvania; E. L. Newdick, Maine; M. F. Barrus, J. M. Hurley, Karl Fernow, E. V. Hardenburg, New York; H. T. Gussow, J. Tucker, D. J. MacLeod, W. Boulter, Canada; A. H. Gilbert, Vermont; W. M. Peacock, Washington, D. C.; J. W. Weston, Michigan; R. F. Poole, C. M. Haenseler, L. G. Campbell, Ellwood Douglass, O. G. Bowen, M. A. Clark, and W. H. Martin, New Jersey.

On Monday those present were furnished with inspection blanks and asked to inspect three rows of 100 hills each of the Irish Cobbler and two of the Green Mountain variety. The results of this inspection indicated the need of conferences of this kind. While considerable variation was apparent in the counts of leaf-roll the greatest difference of opinion was experienced in determining spindle-tuber. After the inspections had been made and the results discussed, the same rows were re-inspected and each plant examined. The results of the intensive study of typical spindle-tuber plants were apparent since at the second inspection of these rows the counts were much more uniform. The remainder of the day was spent in examining plantings of seed of different varieties from a number of sources.

Monday evening was spent in a discussion of ways and means whereby seed potato certification methods might be improved. Some of the points discussed follow:

1. Number of hills necessary to count. It was the general opinion of those present that at least five counts of one hundred hills each be made in a planting of one acre. These counts to be made in various parts of the field. In a field of 5 acres, 3 counts per acre was considered to be satisfactory; in a field larger than 5 acres the inspector should use his own judgement concerning the

number of counts to make. It was suggested by Dr. E. V. Hardenburg of New York that biometrical studies be made to determine the number of hills necessary to count for accuracy. He suggested that this work might be undertaken at Cornell.

In this discussion it was suggested that the inspector should not attempt to count all diseases present at one time. It was considered advisable that he count the leaf-roll plants in the 100 hill unit, then mosaic and finally spindle tuber or such other diseases as were present. By following this method it was felt that there would be less chance of error in the inspection since the inspector, having one type in mind, could complete his count of this without confusing it with another type.

2. Weak hills. An attempt was made to define this term. It was the consensus of opinion that a distinction be made between weak and delayed hills. Dr. Gussow suggested that weak hills might well arise from three causes:—(A) delayed germination, (B) rotted seed piece, (C) the presence of disease. In the case of the plants included under (A) he believed it inadvisable that fields be disqualified at the time of the first inspection due to the presence of these hills. It was suggested that these hills be referred to as lacking in vigor rather than weak.

3. Tolerance of Rhizoctonia and Scab. It was agreed that while the presence of these two diseases on seed did not reduce its vigor in any way, it was inadvisable that certified seed show excessive amounts, since the average grower is inclined to purchase seed on appearance. After some discussion it was considered advisable that the limit of tolerance be placed at 10 per cent of scab or rhizoctonia or 10 per cent combined.

In the cases of tubers showing wire worm injury it was suggested that no limit of tolerance be stated. This was considered to be unnecessary in view of the fact that many of the states are now using the U. S. Grades for grading their seed stock. It was generally agreed, however, that tubers showing wire worm injury be removed so as to improve the appearance of the pack.

4. Protection of Certified Seed against Fraud. W. M. Peacock presented the results of his investigation on the abuse of the term "certified" in connection with seed potatoes. Tags from some of the Western states were shown which would indicate the potatoes to be certified by the usual authorities but which on closer examination proved to be spurious.

The question of the possibility of registering some appropriate trade mark was discussed in considerable detail. This met with several objections. It was held that after years of effort to establish the word "certified" in connection with seed potatoes it would be inadvisable to institute any other word or arrangement of words. It was felt also that the chances of imitating a trade mark would be no more difficult than it is to imitate the word "certified" at the present time. The real solution to the problem was considered to be the passage of a law similar to the one in effect in

Canada which would prohibit the use of the word certified unless the seed had been inspected and certified by the proper authorities in the various states. After some discussion, W. A. McCubbin of Pennsylvania made the following motion: We recommend that the committee on seed potato certification of the Potato Association of America consider the possibility of formulating plans to protect the country at large from unauthorized or spurious seed potato certification; such plans as the committee may formulate to be presented at the next annual meeting of the Potato Association of America.

On Tuesday morning a good opportunity was afforded to examine typical spindle-tuber plants. In a planting of seed from different sources some lots showed 30 per cent of this disease. The conference ended at New Brunswick at noon. Before leaving those in attendance voted that a similar conference be held in 1926. It was agreed that samples of the various degeneration diseases be sent to New Jersey from each state to be planted in tuber units. Arrangements have already been made for taking care of this work and there is no question but that a conference of this kind will do much to clear up some of the problems which are now confronting the seed potato inspectors.

THE EIGHTH ANNUAL LONG ISLAND POTATO TOUR

Walter M. Peacock

This tour started at Mineola, Wednesday morning, June 24 and ended at noon on the 26th at Water Mill. It was very well attended both by the growers on the Island and those interested in seed potato improvement work from up-state, other states and provinces.

Seven seed source test plots of the Green Mountain variety and two of the Irish Cobbler variety were visited. These plots demonstrated that there were considerable differences in the amount of disease present in the plants from different sources and much interest was shown in these plots, especially by those who had a personal interest in certain strains. These plots also indicate that there is an urgent need for standardizing seed certification requirements and more careful inspection work.

The first night was spent at the State Institute of Applied Agriculture where everyone was made to feel at home by an address of welcome by Director H. B. Knapp. Following the address of welcome, Director R. W. Thatcher of the New York State Experiment Station spoke on the "Experiment Stations and their relations to the farmer." It was a very instructive address.

During the tour other addresses were given.—"Seed borne diseases and program of control", by Dr. E. E. Clayton; "Developments of potato scab control" by Dr. M. F. Barrus; "Problems that

confront the seed potato grower", by J. C. Crissey; "Lessons to be drawn from a study of marketing potatoes", by Prof. M. P. Rasmussen. At the Long Island Vegetable Research Farm those in charge, including Prof. P. H. Wessels, Dr. H. C. Hockett and Dr. E. E. Clayton gave brief talks concerning the investigational work being done at this station and showed the visitors their experiments. At dinners the visitors not on the program and several local growers were called upon for short talks or an account of the condition of the crop in the section they represented.

POTATO NOTES

Time did not permit the editor to send out about twenty-five requests for information concerning the condition of the crop in different localities. It not only takes time to send out these requests but money that could be used to advantage in other ways in making The Potato News Bulletin a better publication and it should not be necessary. Every member of the Potato Association of America should feel equally responsible for the progress of this organization and for its publication. Remember that all work done for the good of this organization and on its publication by all members is gratis. What would you say if your editor should forget to publish, to be concrete, the July number, or give an excuse that he did not have time or had been out of town? You may be unaware of the fact that the editor has burned considerable midnight oil while working on this publication. There can never be too much information concerning the crop in the different localities, nor too many opinions on the crop in the same locality.

Greeley, Colo.—Notes from The Eye, dated July 11. The potato prospects are a little better than they were a few weeks ago, although it is still believed that the potato yields will not be normal in the Greeley district this year. It is estimated that the 1925 acreage is about 15,000.—**Walter M. Peacock.**

Connecticut.—On June 27 and 28, the writer was at Storrs and Highwood. The latter place is just north of New Haven and in one of the best fruit and vegetable sections of the state. All crops were looking good. Ideal climatic conditions for potatoes had prevailed except a few hot days the first of June. Prospects are good for a large yield per acre. However, there has been a big reduction in potato acreage probably from 20 to 25 per cent.—**Walter M. Peacock, July 9.**

Kansas.—You will, no doubt, be interested in a few notes regarding the Annual Kaw Valley Potato Tour. The tour included the important potato producing counties in the state.

Our crop prospects for this year are greatly below those of previous years and I doubt if we will ship within 1500 cars of what we did last year. A severe frost damage has set the crop back

and will reduce the yield greatly. Fortunately most of the seed in the Valley was treated this year. If it had not been, many fields would have been plowed up long before harvest time. However, with very favorable weather conditions a partial crop can be expected.

All certified seed this year, I believe is showing up to better advantage than it ever has in the state heretofore. We have found Green Mountains and considerable black leg in some of the fields but the certified fields are uniformly almost free from these two difficulties. Our harvest will begin about June 25th.

Mr. P. N. Davis from Hollandale, Minnesota, spent the greater part of the time with us on the tour. He was interested in seeing strain tests which included some of the seed grown in Hollandale.
—**E. A. Stokdyk, Specialist in Marketing, June 8th.**

Presque Isle, Me.—Notes from The Eye dated July 11. Potatoes are growing rapidly. With an abundance of moisture for the last three weeks potato vines have made large growth with small development of root system.

Flea beetles have been hard to find this season and to date potato bugs are very scarce.—**Walter M. Peacock.**

New Brunswick.—The spring was very dry and cold. Potato planting began earlier than usual, about April 25th and was completed May 25th. Little rain fell until June 15th, since which time weather conditions have been ideal for growth.

The stand of plants in many fields has considerable misses. The acreage is approximately ten per cent less than last year with a corresponding decrease in the acreage grown for seed certification. In the Bay of Chaleur district the decrease is as much as 20 per cent less than last year. The decrease in the St. John River Valley district is only slight.

Practically all of last year's crop has moved. Three cargoes sailed during June to Cuba, cleaning up about everything.—**O. C. Hicks, Sec-Treas. New Brunswick Seed Potato Growers Association. July 4.**

New Jersey.—During the latter part of June potatoes were suffering much from a six weeks drought in both of the early potato sections, namely central and southern New Jersey. It would be conservative to estimate the amount of injury in central New Jersey to be 25 to 40 per cent and in southern New Jersey the injury will vary from 35 to 100 per cent according to location and soil type. It has been reported that several growers in Burlington, Camden and Gloucester counties on the lighter soils were plowing up their potato fields with no attempt to harvest, while others are harvesting a yield varying from 10 to 30 bushels per acre. On soils that retain the moisture well in Cumberland and Salem counties and with ideal growing conditions from July first until usual harvest time the yield of U. S. Grade No. 1 may vary from 75 to 125 bushels per acre.

In central New Jersey potato section the absence of the American Giant variety was noted. It has been replaced by the Irish Cobbler variety.—**Walter M. Peacock.**

New Jersey.—The condition of the potato crop in southern New Jersey is anything but good. While some fields will possibly dig 125 bushels per acre many will not dig 50 bushels. Last season approximately 800 cars were shipped from this section; this year it is estimated that the total shipments will be less than 400 cars.

The Salem County growers conducted their annual potato tour on July 9 with 150 in attendance. One of the outstanding features of the tour was the results of thorough spraying with Bordeaux mixture. In unsprayed fields the plants were yellow, flea beetle injury was extremely severe and tip burn and hopper burn commonly present. In sprayed fields, on the other hand, the plants were still green and growing vigorously.

In the comparison of northern vs. southern grown seed of the same strain the New Jersey grown Irish Cobblers showed less than 2 per cent dead leaves as compared with 60 per cent on that grown in Maine. In the case of the Green Mountain variety, no differences were apparent between the Maine and New Jersey grown seed.

The New Jersey growers are preparing to plant their late crop, grown for seed purposes. This crop is planted between July 25 and Aug. 10. The indications are that the acreage will be somewhat smaller than last year.

The crop prospects in central New Jersey are much better than in the southern part of the state. Within the past week there have been several heavy rains and the crop is already looking better. In many cases growers who felt that they would not dig more than 40 barrels an acre have raised their estimate to 60 barrels.

While some potatoes are being dug at the present time for local markets, active harvesting will not start until about July 20. This year central and southern New Jersey will dig the Irish Cobbler variety at about the same time.—**W. H. Martin, July 10.**

Long Island, N. Y.—During the latter part of June potatoes needed rain all over the Island. At this time potatoes in Nassau County were suffering more from the drought than those in Suffolk County, especially those in the latter county in the Orient and Water Mill districts. With ideal conditions from now to harvest time and with a slight increase in acreage the total production should be normal.—**Walter M. Peacock.**

North Carolina.—The estimated acreage of early potatoes for 1925 in this State is 22,100 acres, with a yield of 107 bushels per acre and a forecasted production of 2,365,000 bushels. The harvesting began May 25th and is expected to end about July 5th.

From the standpoint of shipments, the North Carolina potato season for 1924 surpassed all former records. For the entire season the shipments amounted to 6,592 cars. This was due to in-



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creased acreage and high yield. A total acreage of 22,550 cars with an average yield of 140 bushels to the acre was obtained.—**C. D. Matthews, June 11th.**

Nova Scotia.—After reading in The Potato News Bulletin how everyone else has planted their potatoes and how large an acreage they have decided to speculate on, it seems as though Nova Scotia should be again introduced to the readers. It is our opinion that the general acreage in this province will not be materially decreased from last year. Our certified seed growers are planting their full quota. Garnet Chili variety will have a full or increased acreage and Green Mountain and Irish Cobblers about the same.

Last year we started an experiment to test the efficiency of some aphicidal dusts as a means of controlling the spread of degeneration diseases. This year, the plot treated with nicotine dust (5 lbs. nicotine sulphate in 100 lbs. dust) have not only started germination earlier but a month after planting were an average of two inches taller than those which received only the regular dust or spray applications without the nicotine. We have not been able to take notes on the spread of disease in these plots this season. Little or no spread was observed last year. This experiment may ultimately prove of considerable interest to dust enthusiasts. It is also being duplicated at Fredericton, N. B. this year.—**J. Y. Hockey, Pathologist in Charge. June 10th.**

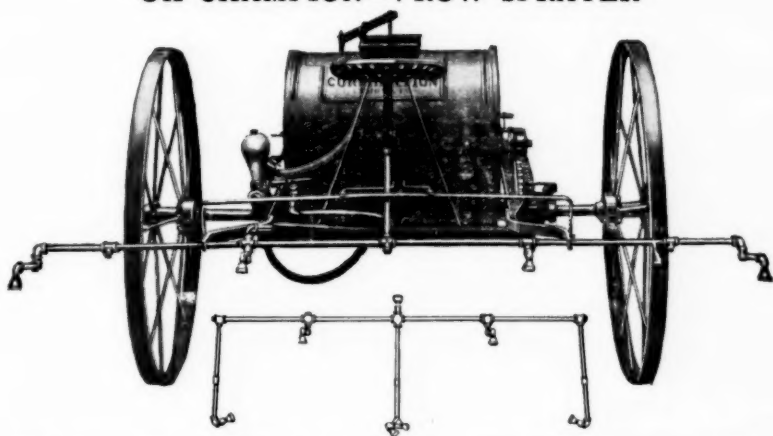
Virginia.—Shipments of Irish potatoes from Eastern Shore have been made in considerable volume in the past few weeks. From 400 to 700 cars have moved daily during the height of the shipment. The total shipped to June 30th has been 5,699 cars compared with 2,602 last year. This is the largest shipment prior to June 30th since the year 1921, when 6,496 cars were shipped prior to that date.

It is interesting to note that the volume of potatoes moved did not materially depress the market. On some days, during the peak of shipments, as many as 900 cars of potatoes were placed on the markets in the United States without causing a serious slump in prices. The f. o. b. price in the Norfolk and Eastern Shore sections have been between \$4.00 and \$4.75 per barrel, which, where a fair yield has been secured, is a sufficient price to net some profit to the grower.

On the average, the season has been considered a successful one in the Norfolk section and in Northampton County on the Eastern Shore. In both areas the yields have been fair—some few yields as high as 80 or more barrels per acre have been reported, but yields of 40 to 50 barrels are nearer the average. In Accomac County lack of rainfall during the growing period has practically reduced the yield 50 per cent. In some cases yields as low as 15 to 20 barrels per acre are reported, but few potatoes have been dug as yet in this area.

All indications point to a much higher market by the middle of July on account of shortage of the Accomac County crop, which

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usually supplies the Eastern markets during the month of July.

Because of the general scarcity of rainfall this year, the results secured by the use of cover crops grown last year and turned under during the fall or winter months, have been very marked. At the Virginia Truck Experiment Station an approximate increase of 20 barrels to the acre was secured by turning under a large growth of sorghum last fall. On the Eastern Shore Experiment Station, at Onley, areas which have been liberally supplied with organic matter have made a large fine growth and have held up in spite of the drought, while those lacking in humus will, in many cases, make a very poor crop.

The 200 farmers who visited the Station on June 16th, at the time of the Accomac County potato tour, were much impressed with the showing made by the use of large quantities of cover crops turned under. Because of the scarcity of stable manure, it will be necessary for the truckers in Eastern Virginia to resort to more soil improvement crops if they expect to maintain a profitable yield of potatoes.

Probably the most striking observation noted on the potato tour was the scarcity of disease in the lots of certified seed secured from various sections of the country.—H. H. Zimmerly.

NOTES ON RECENT LITERATURE

ANONYMOUS.—Potato lifting-roguing and grading (Isles of Scilly, St. Mary's May 9th)—*The Fruit Grower* 59: 789, 1925.

Under date of May 9th, the author notes that potato digging has begun in earnest and that shipments have increased from a few baskets a couple of weeks ago to 15 tons per boat. The crop is reported to be good and the total output is expected to be an average one. The interesting feature of the article is that of prices received. On this line the author says "Prices remain fair at about 6d (12 cents) per pound". Last year first shipments brought 1s-3d, or about 30 cents per pound, against a maximum of 8d (16 cents). This season roguing of seed is suggested as a means of securing pure stock for planting. Grading sets before planting is recommended so as to insure evenness of growth and maturity of plants.—**W. Stuart.**

ANONYMOUS.—Jersey potatoes.—*The Fruit Grower* 59: 789, 1925.

The Jersey outdoor potato crop has begun to move in real earnest. On Wednesday, May 6, six loads came down the weighbridge which changed hands at 34 to 36 shillings per cental (112 lbs.) or at the rate of approximately 7.28 to 7.71 cents per pound.—**W. Stuart.**

EVERHARDT, M.—Multiplication despommes de terre par tubercles sectionnes et pelures.—*Rev. Bot. Appliquées et Agr. Colonial* 5th Ann. Bul. 41, Jan. 1925, pp. 64-66.

The author presents data obtained from a comparison of the relative merits of whole and cut sets and of parings for 1923 in which five varieties were used. The results showed a slight increase in yield from cut sets over whole sets and a very decided decrease from potato parings.

GILBERT, A. H. AND HAROLD L. BAILEY.—Certified seed potato growing in Vermont. Insect and fungus pests and their control.—*Vermont Dept. of Agr. Bul.* 34.

In this publication the authors cover the following subjects—What are certified seed potatoes, law relating to the certification of seed potatoes, cost of certification, how to produce certified seed, descriptions and control of potato diseases, and potato insects and their control. Under the heading of degeneration diseases, mosaic, leaf-roll, spindle-tuber and giant hill are described.—**Walter M. Peacock.**

GOSS, R. W.—Two important groups of Nebraska potato diseases, 1. Potato wilt and tuber rots, 2. "Run out" potatoes caused by degeneration diseases.—*Nebraska Agricultural College Extension Circular*, 1256, April 1925.

The author points out that the first group consists chiefly of two distinct diseases: (1) A *Fusarium* wilt and stem-end rot which occurs in the field and continues its damage as a rot of the tubers

in storage. It is stated that this disease is becoming increasingly prevalent in the newer potato sections through the introduction of infected seed. (2) A powdery dry rot which occurs as a storage rot and which does not affect the plant in the field. The presence of this disease has always been a detriment to the sale of Nebraska potatoes, but the damage caused by this disease is rapidly being decreased each year.

The effect of *Fusarium* wilt on the plant and on the tubers are discussed. The cause and source of the disease are explained. The author states that there are two methods by which the fungus attacks the plant. (1) From infested soil through the roots and seed pieces. (2) Directly from stem-end rot seed. The first serious effect of the disease is on the stand. The seed pieces may rot entirely without producing a sprout or the young sprout may be killed by the fungus. Many of the affected plants wilt and die before tubers are formed and others are so greatly weakened that they do not produce well. When the soil contains a high moisture content the yellowing of the vine may be very slight, but under this condition the disease may be working rapidly on the new tubers causing stem-end rot. Potatoes which have become infected in the field may continue to rot when placed in storage.

Healthy seed grown on new land or on land where a long rotation is practiced is the only practical means of controlling the disease. The author states that powdery dry rot has been greatly reduced by careful handling of the crop but it is still the most serious storage rot occurring in Nebraska. The disease is caused by a fungus very similar to the one causing wilt and stem-end rot. It does not attack the growing plant and the disease does not occur in the field. The effect on the tuber appears as a dry sunken area on the surface, varying from a small spot up to a complete rot of the tuber. The fungus is unable to penetrate the healthy skin of a sound potato, but gains entrance through wounds and stem-end rotted areas. Methods of control are—eliminate wounds, clean out the storage every season and keep the temperature of the storage between 35° and 41° F.

Under degeneration diseases, mosaic, leaf-roll and spindle-tuber are discussed. The author states that the loss from spindle-tuber in Nebraska is greater than the loss from any other disease. He also states that more than one of these diseases may occur on the plant at the same time. Good descriptions and illustrations of these diseases are given. As control measures the author recommends planting a seed plot well isolated and planted with selected seed, the removal of all diseased plants, combined with early digging and insect control.—**Walter M. Peacock.**

HALL, THOS. D.—Profitable potato production.—*Jour. Dept. Agr. (Union So. Africa)* 9: 461-465, Nov. 1924.

It is claimed that the potato crop of South Africa ranks third in

bulk bag production, and fifth in monetary value, being surpassed by maize, wheat, oats and lucerne. About 100,000 acres are devoted to potato production and the highest production reached was 1,700,000 bags in 1921-22. The average yield for the Union is only 15 to 18 bags (a bag equals about 200 lbs.) per acre. The Transvaal is considered far the best potato province. Its average yield during the past five years has steadily increased from 13 to 21 bags per acre. This increase is believed to be attributable to a steadily increasing use of commercial fertilizers by the progressive farmers of Bethal, the Union's best potato district, both for bulk production and average acre yield, which is around 32 bags, approximately 107 bushels. The best farmers get 50 to 100 bags (167 to 334 bushels) per acre. An interesting account follows of some experiments with commercial fertilizers made for the purpose of determining the most profitable amounts of superphosphate, sulfate of ammonia and sulfate of potash to use. An application of 300 pounds of superphosphate per acre made a difference of 44 bags. Other fertilizer ingredients did not give a definite increase.—**W. Stuart.**

MOORE, H. C.—The blue ribbon spud growers speak.—*Mich. Farmer* 164: 677, 683, May 23, 1925.

Last year thirty-seven of Michigan's elite potato growers qualified for membership in the 300 bushel club of the Michigan Potato Producers Association by each producing 300 bushels or better of potatoes per acre on at least two continuous acres. The average acre yield of the thirty-seven growers was 373 bushels of which 323.5 bushels were U. S. Grade No. 1. All of them planted certified seed, and all treated their seed in the corrosive sublimate solution. Thirty-six planted in drills, the other members check-rowed. The spacing distances were 33x15 in.; 34x13 in.; 36x12 in., and 34x22 inches. The highest yield of 510 bushels per acre was spaced at 33x15 inches. The average amount of seed used was 20.6 bushels per acre. Twenty-eight planted on a sandy loam soil; nine on heavy or clay loams. Thirty-two used stable manure at the rate of 11.3 tons per acre, while all but four grew their crop on an alfalfa or sweet clover sod. Early plowing gave best results. Early planting improved the quality. All sprayed their crop. Average number of sprayings during season was 5.2.—**W. Stuart.**

MURPHY, P. A. AND ROBERT MCKAY.—The development of blight in potatoes subsequent to digging.—*Jour. Dept. Lands and Agric. Ireland* 24: 103-116. 1924.

An experiment was carried out during 3 blight years from 1920 to 1924 to determine: (1) how long following death or removal of blighted foliage tuber infection continues to develop as compared with tubers from plants with blighted foliage in active condition; (2) whether there is any spread of blight to tubers that are really free from infection at the time of storing; (3) whether there is sufficient evidence of the blight fungus living independently in the soil for any considerable period. Part of the results have pre-

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viously been published in Sci. Proc. Roy. Dublin Soc. vol. 16, No. 29, 1920-1922.

It was found that digging when the stalks are still alive but infected results in the largest amount of infection. This develops within 15 to 30 days after placing in storage, even though all obviously diseased tubers are sorted out before storing. Removing the blighted vines before digging, or digging after a sufficient interval following death of the stalks, reduces infection, the amount of reduction depending on the activity of blight on the foliage, and elimination being complete in 53 days. During this period tubers may be infected from the soil, *Phytophthora* being able to maintain itself in the soil for a limited period, the duration of which is not determined solely by weather conditions.

The use of blighted foliage as even a temporary cover for tubers in pits or heaps is a source of great danger of spreading infection.

Blight does not spread from tuber to tuber in storage but often leads to soft rot in which other than blight-free tubers may be involved. The amount of blight infection may be reduced by storing in boxes instead of pits, and by sorting out all blighted tubers several times during the first two months of the storage period.—**F. Weiss.**

ROSA, J. T.—Potato Production in California.—*California Agricultural Experiment Station Circular 287, May, 1924.*

This circular contains 42 pages and is well written and illustrated. The principal subjects covered are,—the potato status in California, the potato districts in the state, varieties, selection of seed potatoes, factors affecting seed quality, preparation of seed for planting, cultural practices including irrigation, insects of the potato, diseases of the potato and control measures, and production of certified seed.—**Walter M. Peacock.**

TICE, C.—Certified seed potatoes—Why they will pay.—*Dept. of Agriculture, Province of British Columbia, Soil and Crop Circ. 1, (Revised).*

The author explains what are certified seed-potatoes and points out clearly that each sack of certified seed-potatoes carries the official tag of the Department of Agriculture. He also warns the public against purchasing potatoes as certified seed unless the official tag is attached. Care required in growing certified seed is discussed. In speaking of diseases, the author says that leaf-roll and mosaic are the worst potato diseases existing in the province and they reduce the yield from 50 to 75 per cent below normal. These two diseases are described so that they may be recognized. Another important factor brought out is the value of the purity of the variety in purchasing seed. The value of certified seed is discussed and the author states that the use of certified seed on many farms would double the yields now being obtained.—**Walter M. Peacock.**

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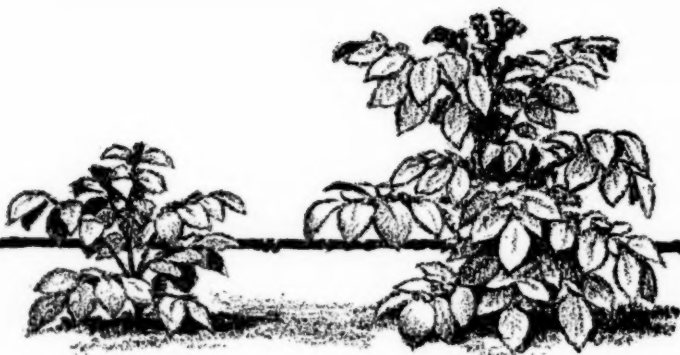
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